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TRAINING AND DEVELOPMENT AND EDUCATION AT LAWRENCE LIVERMORE NATIONAL LABORATORY

by

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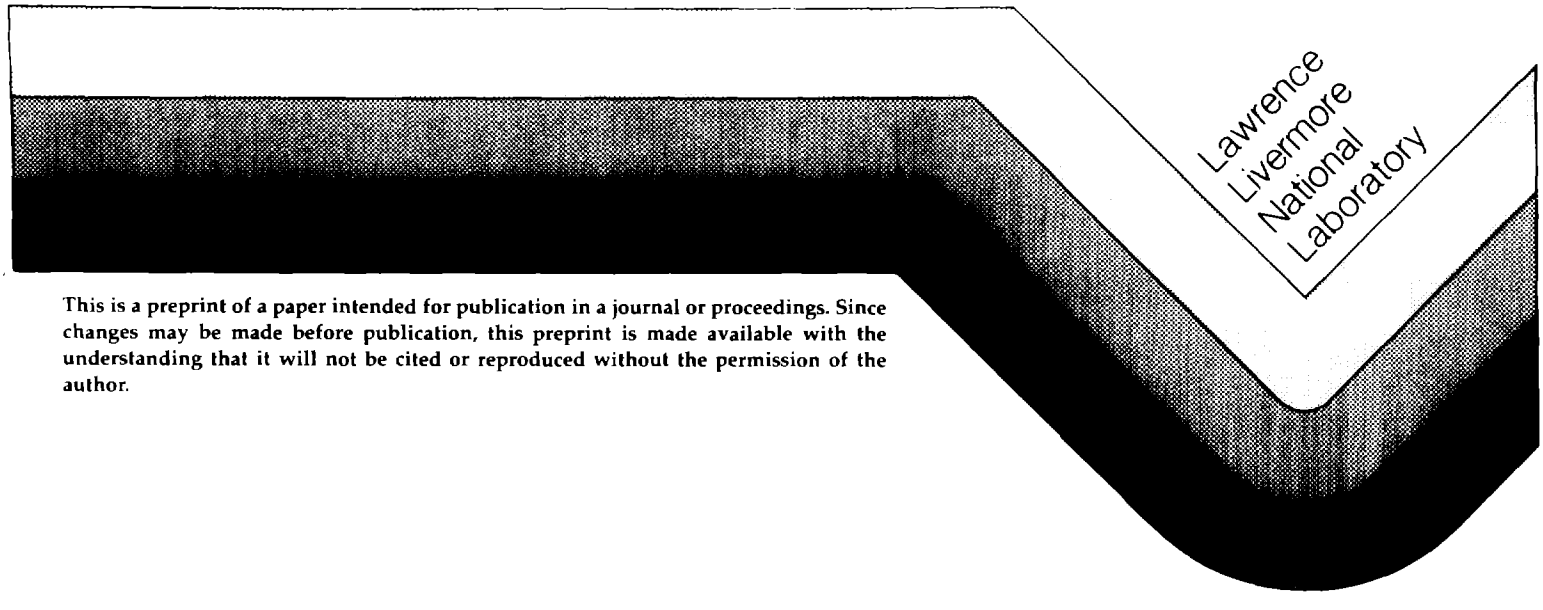

Over 2,700 scientists and engineers are engaged in defense and energy related research and development at Lawrence Livermore National Laboaratory (LLNL), a major contractor of the U. S. Department of Energy. To help maintain the vitality and creativity of a staff totaling 7,600, LLNL provides a broad spectrum of education, training and developmental opportunities. On-premises technical and non-technical training and education programs may be presented live in standard classroom format or via satellite on live television broadcast. LLNL has a television studio and 19 channels of an internal television network devoted to educational programming. Employees wishing to pursue academic education can choose to enroll in colleges or universities that televise courses to LLNL, or elect to attend one of the more than 30 local institutions within commuting distance. A mini-campus of the University of California's Department of Applied Science is located on the Laboratory site. Attendance and participation in conferences, workshops and courses sponsored by external organizations and professional societies provide additional developmental opportunities. In 1984, LLNL had 20,600 enrollments in all the employee development activities described. Total costs, excluding student time in class, were approximately 1.5% of the Laboratory's operating budget.

Background

Under contract with the United States Department of Energy, the Lawrence Livermore National Laboratory is operated by the University of California to conduct research and development. Approximately half of the Laboratory's operating budget is in support of defense projects related to nuclear weapons. The balance goes mainly to research on energy and biological and environmental science.

The Laboratory has a total staff of 7,600. In addition to 2,700 scientists and engineers, there are approximately 3,100 individuals providing technical and crafts support and 1,700 administrators. Graduate degrees are held by 67 per cent of the scientific and engineering staff; 1,100 hold Ph.D.s.

Characteristics of LLNL Education and Training

If asked to describe the uniqueness of the LLNL education and training programs, the phrase "diversity of options" could well be most appropriate. Based on Laboratory policy of encouraging the career development of its employees, the organization has developed many different programs, delivery systems and administrative structures to meet the diverse needs of its staff. Within this diversity are programs that recognize the importance of developing the interpersonal skills of employees as well as the technical expertise.

Programs

Educational Aids:

This program provides Laboratory support of academic courses through tuition reimbursement and up to six hours per week of time off with pay to attend courses at colleges or universities. The major users of the program are scientific and technical staff, despite the fact that the opportunity is made available to all employees.

Employees attend over thirty different colleges and universities within commuting distance of LLNL. As an alternative to traveling to campus, employees may choose to attend a handful of local college courses brought to the Laboratory site, or to enroll in programs that are televised live with talkback capability. LLNL receives ten channels of live educational television (See Fig. 1): four from Stanford University; two from UC Davis; four from the Association for Continuing Education (ACE). ACE sells broadcast time to several schools: Golden Gate University, San Jose State, Northeastern University, and Foothill College.

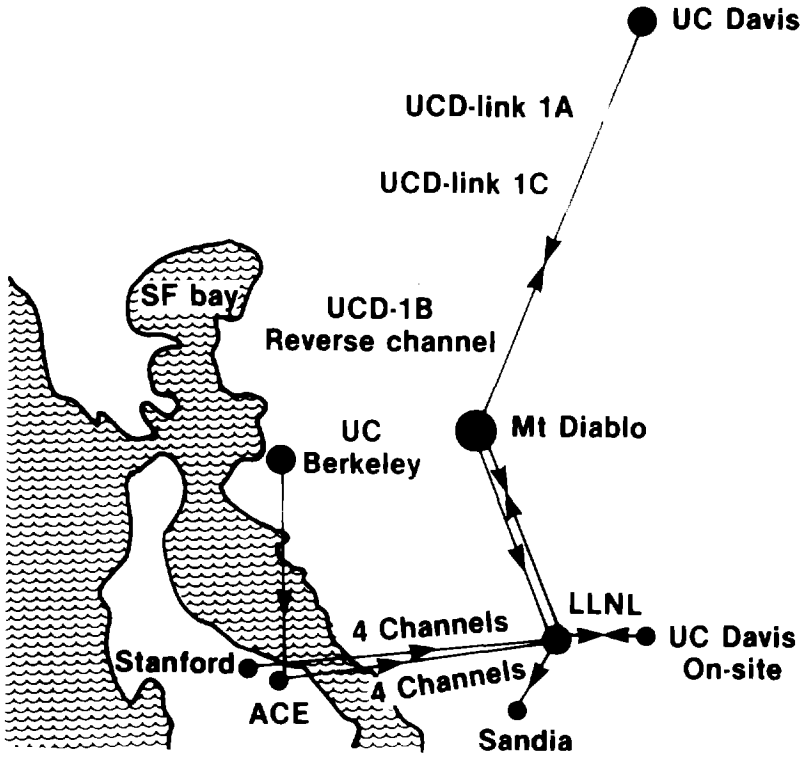

Figure 1. LLNL receives ten channels of live televised university courses and transmits one channel to UC Davis.

The Stanford television program provides graduate degrees, principally at the Masters Degree level, in several engineering and science majors. The UC Davis program provides both M.S. and Ph.D. degrees over television, all in engineering majors. The programs provided by ACE include Masters in Business Administration and several undergraduate certificate programs as well as general technical and non-technical courses.

Another alternative is enrollment at the mini-campus of the UC Davis, Department of Applied Science (DAS), located at the Laboratory (See Fig. 2). Offering graduate degrees in Applied Science and Computing Science, the department relies on LLNL scientists and engineers as guest lecturers and part-time faculty. LLNL management works closely with the faculty to develop curricula and thesis projects appropriate to Laboratory needs. In a unique supplement to the Davis campus offerings, the courses taught in Livermore are broadcast live via television back to the main campus, thereby taking full advantage of the LLNL scientists who are part-time lecturers or faculty.

Figure 2. Located at LLNL, the University of California, Davis, Department of Applied Science (DAS) provides opportunity for employees to enroll in graduate courses.

The 100 students enrolled in degree programs at DAS can be categorized into two major groups. Approximately forty full-time Laboratory employees are completing degrees. Approximately sixty are participants in a special program that combines part-time employment at LLNL with full-time student status. The UC Davis Student-Employee Program is a unique collaboration between academia and LLNL. Students accepted into the program are provided job placement in research areas of the Laboratory that have potential academic thesis interest.

In addition to individuals in degree programs, there are a large number of employees taking occasional course work as well as auditors at DAS.

The Educational Aids Program is administered by the Employee Development Division of Human Resources. Reimbursement is funded by general overhead and open to any employee, with his management approval, wishing to enroll. Oversight of graduate education is provided by the Student Policy Committee, comprised of managers appointed by the Director.

In 1984, 374 employees requested educational support totalling $300K.

Technical Non-Credit Education:

These courses and seminars are targeted for the scientific and technical staff. They are non-credit and intended to help maintain staff alertness and vitality by providing employees with state-of-the-art information, review of previous knowledge or a brief overview of technology topics. Courses range in length from one or two hours to an academic quarter.

A variety of instructional resources is available: (1) in-house experts who teach courses to a live audience in our TV-studio classroom (See Fig. 3). The resulting video tapes become part of our video tape library. While their primary use is for makeup purposes, they can also be used for reteaching courses; (2) outside consultants; (3) all of the live television courses described earlier, which are broadcast from Stanford University and the University of California, Davis, can also be taken on a non-credit basis; (4) courses at the University of California, Davis, Department of Applied Science mini-campus located on Laboratory premises are available for non-credit as well as credit; (5) satellite transmitted courses sponsored by professional societies or universities; (6) video tapes of over 220 in-house produced courses.

Figure 3. By using its TV-studio classroom to videotape courses, LLNL ensures the capability of reteaching complete courses as well as the option of makeup sessions and independent study.

To view video-based courses, employees can use seven uniquely equipped television classrooms. Six of the seven classrooms are equipped with talkback to enable students to participate in class discussion. For makeup or review, employees can check out tapes for individual viewing or schedule to have them transmitted over the Laboratory's hardwire television network for viewing on any of more than 100 monitors located throughout the site.

Technical non-credit education is coordinated by an oversight committee appointed by the Laboratory Director. Each major scientific and engineering department is represented by a high level manager. Although each department determines its own course needs and administers its own programs, the committee provides overall guidance and ensures that Laboratory policy is followed. In the large departments education administrative staffs average two to three. There are no full-time technical trainers.

In 1984, there were 1,777 enrollments in 228 courses. Student time totalled 4,284 days.

Future interest is in developing short intensive courses that provide information on state-of-the-art technology unique to our research and programmatic needs.

Non-technical Professional Development:

These courses focus on the interpersonal skills necessary for effective staff performance. Included are management development, supervisory training, business communications, and other personal development courses. With the exception of management and supervisory courses, they are open to all employees. Courses are taught in standard classroom format by full-time Laboaratory instructors, consultants or, occasionally, Laboratory managers or supervisors. Non-technical professional training is provided by the Employee Development Division of Human Resources. A staff of eleven, including five full-time trainers, design and implement programs.

In 1984, there were 3,337 enrollments in 190 courses. Student time totalled 5,201 days.

Other On-Site Programs:

These courses include security and safety orientations, materials handling methods, word processing training, apprenticeship programs, and other highly job specific applications. They are taught through a variety of formats including live experiential training, programs in conjunction with the local community college, and by video tape. Courses are sponsored by the department with programmatic responsibility for a function such as safety.

In 1984, there were 10,505 enrollments in 804 courses. Student time totalled 5,683 days.

Special Programs:

Several programs provide development opportunities for specialized audiences.

- Undergraduate Scholarship Program.
  Participants are paid full salary to attend school full time to complete an undergraduate degree. Approximately four awards are granted each year.

- Professional Research or Teaching Leave.
  Participants are granted partial salary to enhance their professional growth at institutions both within and outside the United States. Approximately 8 - 12 appointments are made each year.

Conference Travel:

These are trips on which employees are presenters or attendees. In 1984, employees made 1,864 conference trips.

Off-site Training:

To augment the on-site and local educational offerings, employees may attend short courses off site. These courses may be technical, scientific or non-technical in nature. These are developed by universities and other outside organizations for attendance by the general public. They are usually short, intensive and carry no academic credit. In 1984, employees enrolled in 2,556 off-site courses, approximately 75% on scientific and technical topics.

Summary

In addition to the cafeteria of opportunities LLNL provides its employees, there are other factors that create an atmosphere that affirms education as important and encourages an employee to decide on his own career needs. For example, employees are given full information on all on-site activities. Each quarter every employee is mailed complete course descriptions and schedules of LLNL sponsored programs. As another example, almost all courses are taught during normal work hours.

Through a combination of Laboratory policy, practices and diversity of options, LLNL management actively commits to the career development of its employees.

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